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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/781,687	02/12/2001	Malcolm James Grieve	DP-302902	6142

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EXAMINER

RUTHKOSKY, MARK

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 11/05/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/781,687

Applicant(s)

GRIEVE ET AL.

Examiner

Mark Ruthkosky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 20-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 16-19 is/are rejected.
- 7) ☐ Claim(s) 14 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5, 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Information Disclosure Statement

The information disclosure statements filed 5/30/2001 and 8/14/2002 have been placed in the application file, and the information referred to therein has been considered as to the merits.

Drawings

The drawings filed on 2/12/2001 have been approved.

Election/Restrictions

Applicant's election of claims 1-19 in Paper No. 8 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

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international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 9-13, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Singh et al. (US 5,686,196.)

The instant claims are to a trap for use with energy conversion devices comprising a trapping system including a filter element and a trap element. A reforming system is fluidly coupled to the trapping system with the trapping system positioned after the reforming system.

Singh et al. (US 5,686,196) teaches a trap for use with energy conversion devices comprising a trapping system including a filter element, such as a Pd-Ag membrane coated on a porous nickel support material, and a trap element. A reforming system is fluidly coupled to the trapping system with the trapping system positioned after the reforming system (see column 3, lines 44-53 and figure 1.) Thus, the claims are anticipated

Claims 1, 9-11, 16, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Chiyan (JP 07-233,379.)

Chiyan (JP 07-233,379) teaches a trap for use with fuel cell energy conversion devices comprising a trapping system including a filter element and a trap element. A reforming system is fluidly coupled to the trapping system with the trapping system positioned after the reforming system (see the abstract and drawings.) Sulfur impurities are removed using a filter comprising zinc combined with a trap (as noted in paragraphs 17-27.) Thus, the claims are anticipated

Claims 1, 9-11, and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Gmeindi et al. (US 4,921,765.)

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Gmeindi et al. (US 4,921,765) teaches a trap for use with energy conversion devices comprising a trapping system including a filter element and a trap element (see col. 6, line 1 to col. 7, line 10.) A reforming system is fluidly coupled to the trapping system with the trapping system positioned after the gassifier reforming system (see figures, claims and throughout the specification.) The filter may be a ceramic filter and the trap may be zinc ferrite, calcium oxide or calcium carbonate (col. 5-6.) Thus, the claims are anticipated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gmeindi et al. (US 4,921,765) in view of Walz (US 6,083,637), Toshihiko (JP 61125634) and Sanehiro (JP 03043298.)

Gmeindi et al. (US 4,921,765) teaches a trap for use with energy conversion devices comprising a trapping system including a filter element and a trap element (see col. 6, line 1 to col. 7, line 10.) A reforming system is fluidly coupled to the trapping system with the trapping system positioned after the gassifier reforming system (see figures, claims and throughout the specification.) The filter may be a ceramic filter and the trap may be zinc ferrite, calcium oxide or calcium carbonate (col. 5-6.) Gmeindi et al. (US 4,921,765) does not teach a temperature

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sensor, a pressure differential sensor or a control valve coupled to the trapping system of the fuel cell assembly.

Walz (US 6,083,637), however, teaches a fuel cell system with a reformer, two purifiers and a sensor system before and after each purifier. A reformat supply line valve directs the reformat into the fuel cell stack or bypasses the system in response to the sensor and depending on the purity of the reformat. In addition, Toshihiko (JP 61125634) teaches a trapping system following a reformer in a fuel cell wherein a thermometer in the trapping system detects a temperature rise when the filter accumulates particles. In response to the change in temperature, valves are opened and closed to alter the flow of the reactants in the system (abstract.) Further, Sanehiro (JP 03043298) teaches a filter system following a reformer wherein a sensor located between a filter assembly and a fuel cell is in communication with switching equipment that opens and closes valves in the system to alter the flow of the reactants. The filter system is capable of monitoring pressure loss in a supply pipe passage (abstract.) Solid oxide fuel cells are well described in the art. It would be obvious to one of ordinary skill in the art at the time the invention was made to incorporate a sensor system in the trapping system of Gmeindi et al., wherein a measurable feature in the trapping system, such as temperature, pressure or gas flow, is monitored in order to respond to these changes. As noted in the supporting references, a response to the system change may include appropriate measures to repair the trapping system or alter the flow of the reformat gasses to the fuel cell unit. The artesian would have found the claimed invention to be obvious in light of the teachings of the references.

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Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gmeindi et al. (US 4,921,765) in view of Walz (US 6,083,637), and further in view of Herdeg (US 6,403,243.)

Gmeindi et al. (US 4,921,765) teaches a trap for use with energy conversion devices comprising a trapping system including a filter element and a trap element (see col. 6, line 1 to col. 7, line 10.) A reforming system is fluidly coupled to the trapping system with the trapping system positioned after the gassifier reforming system (see figures, claims and throughout the specification.) The filter may be a ceramic filter and the trap may be zinc ferrite, calcium oxide or calcium carbonate (col. 5-6.) Gmeindi et al. (US 4,921,765) does not teach a reformat control valve coupled to a waste energy recovery burner device that is further coupled to the trapping system as noted in claim 1. Walz (US 6,083,637) teaches a fuel cell system with a reformer, two purifiers and a sensor system before and after each purifier. A reformat supply line valve directs the reformat into the fuel cell stack or bypasses the system depending on the quality of the reformat. Neither reference teaches the contaminated reformat byproduct to be coupled to a burner for burning the contaminated fuel waste.

Herdeg (US 6,403,243), however, teaches a fuel cell system wherein a gas exhaust stream includes a filter element connected to a burner wherein contaminated gasses are removed from the fuel cell system. It would be obvious to one of ordinary skill in the art at the time the invention was made to incorporate a burner with a filter system to burn the hydrocarbon fuel gasses that are contaminated by impurities. One of ordinary skill in the art would understand that the fuel gasses could be safely burned as taught in Herdeg rather than released from the system in an unsafe, combustible manner.

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Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gmeindi et al. (US 4,921,765) in view of Tsukasa (JP 07-258321.)

Gmeindi et al. (US 4,921,765) teaches a trap for use with energy conversion devices comprising a trapping system including a filter element and a trap element (see col. 6, line 1 to col. 7, line 10.) A reforming system is fluidly coupled to the trapping system with the trapping system positioned after the gassifier reforming system (see figures, claims and throughout the specification.) The filter may be a ceramic filter and the trap may be zinc ferrite, calcium oxide or calcium carbonate (col. 5-6.) Gmeindi et al. (US 4,921,765) does not teach the sulfur-adsorbing trap to be a sodalite, scapolite or cancrinate type alumino-silicate material.

Tsukasa (JP 07-258321), however, teaches an absorbent material for removing sulfur compounds from hydrocarbon gasses in fuel cell systems including zeolite materials. Minute amounts of sulfur compounds are efficiently removed from these gasses. Sodalite, scapolite and cancrinate type alumino-silicate material are well known zeolite materials. It would be obvious to one of ordinary skill in the art at the time the invention was made to use sodalite, scapolite or cancrinate type alumino-silicate zeolite materials as absorbent materials for removing sulfur compounds from hydrocarbon gasses in the invention of Gmeindi et al. (US 4,921,765), as these materials will provide an equivalent function of absorbing sulfur materials as other porous zeolites as taught by Tsukasa. The expectation of similar results using zeolite materials as shown in the art would motivate the artisan to use specific species of zeolites as absorbent materials for removing sulfur compounds from hydrocarbon gasses in fuel cell systems. The artisan would have found the claimed invention to be obvious in light of the teachings of the references.

Allowable Subject Matter

Claims 14 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter. The instant claims are to a trap for use with energy conversion devices comprising a trapping system including a filter element and a trap element. A reforming system is fluidly coupled to the trapping system with the trapping system positioned after the reforming system. The filter element includes a particulate filter in the first chamber of the trapping system wherein the particulate filter includes a washcoat disposed on the filter material. The prior art teaches materials, such as a catalyst, on the filter material however there is no teaching of a washcoat material on the particulate filter in the first chamber of the trapping system.

Examiner Correspondence

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1193. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 703-305-0587. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:00.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 703-308-2383. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Mark Ruthkosky

Primary Patent Examiner

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Mark Ruthkosky
10/31/03